

WHAT IS LEJEUNEA TRIGONA? (Studies on Lejeuneaceae subfam. Ptychanthoideae XXII)

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Lejeunea trigona was described by Montagne and Nees (1836) based on a liverwort specimen collected in Peru by the French traveller and palaeontologist Alcide d'Orbigny. The material consists of only a few stems, which according to the original description were taken from a lichen ("in *Parmelia speciosa* parasita"). Although the material is fertile and has both antheridia and perianths, there has been some confusion about the identity of *Lejeunea trigona*, presumably due to the poor condition of the type specimen. The authors of the *Synopsis Hepaticarum* (Gottsche, Lindenberg and Nees 1844–1847) considered the species to be most closely related to *Lejeunea chrysophylla* (Lehm.) Gott. *et al.*, an African taxon now placed in the genus *Acanthocoleus* (Kruijt 1988). Stephani (1911), however, treated *Lejeunea trigona* as a member of the genus *Archilejeunea*. More recently, *Lejeunea trigona* was studied by Kruijt (1985) who considered the species a synonym of *Lejeunea phyllorhiza* Nees 1833. The latter is a widespread neotropical species, which was usually placed in *Dicranolejeunea* but was transferred to *Brachiolejeunea* by Kruijt and Gradstein (1986).

In the course of my work on neotropical Lejeuneaceae for *Flora Neotropica*, I have recently had a chance to reexamine the material of *Lejeunea trigona*. It appears that the species has affinity neither to *Archilejeunea* nor to *Brachiolejeunea phyllorhiza*. The rather flat leaves with reduced leaf lobules and the smooth perianths without or with broadly rounded keels of *Lejeunea trigona* would rule out *B. phyllorhiza*, which has concave and more or less squarrose leaves with large, unreduced lobules, and sharply keeled, ciliate perianths surrounded by winged female bracts. Another important characteristic of *Lejeunea trigona* is its thin stem, which has a distinct hyaloderm and a ventral merophyte which is mostly only two cells across. Both *Brachiolejeunea* and *Archilejeunea* have broader ventral merophytes, being four or more cells wide. In *Archilejeunea*, moreover, a hyaloderm is lacking.

Because of its narrow ventral merophyte and other morphological features, *Lejeunea trigona* undoubtedly bears closest resemblance to members of the genus *Acanthocoleus* (subfam. Ptychanthoideae). This genus was recently segregated from *Dicranolejeunea* by Schuster (1970) and was subsequently monographed by Kruijt (1985, 1988) who recognized seven species, two of which occur in tropical America. Diagnostic characters of *Acanthocoleus* are its rather unspecialized stems, lacking a subepidermis and bulging epidermis characteristic of *Dicranolejeunea*, its untoothed female involucre, its creeping habit and its brownish color. A comparison of *Lejeunea trigona* with the species recognized in *Acanthocoleus* shows that it is different from all of them. Its most striking feature is the strongly inflated perianths which are barely keeled and completely smooth, lacking any trace of cilia. None of the species of *Acanthocoleus* has such perianths. Furthermore, the antheridia of *L. trigona* are borne singly in the axils of leaves just

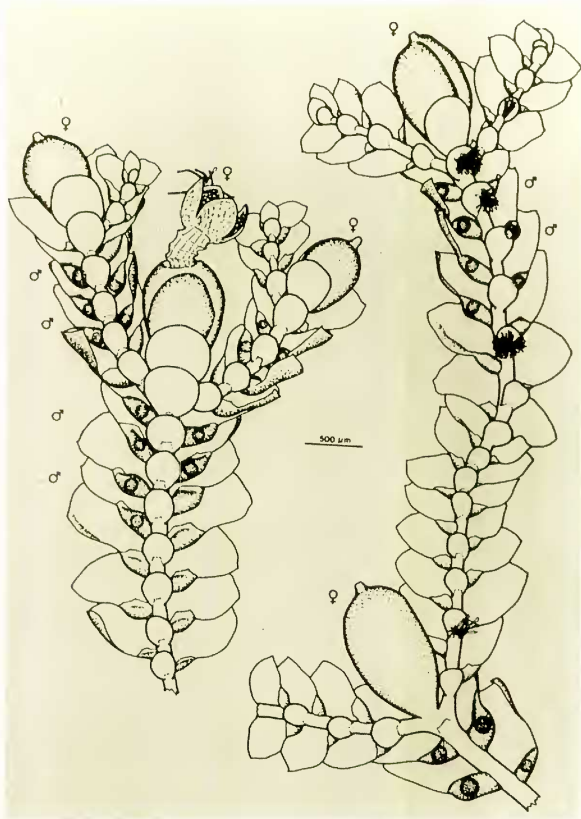


FIG. 1. *Acanthocoleus trigonus* (Nees & Mont.) Gradst.

below the perianth, and the species should thus be considered parocious. Within *Acanthocoleus* a parocious sex distribution is characteristic for *A. juddii* Kruijt from the Greater Antilles and Mexico, and *A. chrysophylla* (Lehm.) Kruijt from Africa. These two species are very different from *Lejeunea trigona*, however, by their keeled perianths with ciliate margins and their apiculate leaves. *Lejeunea trigona* thus appears to be a distinct species of *Acanthocoleus* and the following new combination may be proposed:

Acanthocoleus trigonus (Nees & Mont.) Gradst., comb. nov.

Lejeunea trigona Nees & Mont. in Montagne & Nees, Ann. Sci. Nat. Bot., Sér. 2, 5: 61. 1836; *Archilejeunea trigona* (Nees & Mont.) Steph., Spec. Hep. 4: 721. 1911. Fig. 1.

DISTRIBUTION

The distribution of *Acanthocoleus trigonus* has been remarkably poorly known and for more than a hundred years only the scanty type specimen from Peru has been available. As a happy coincidence, however, I have recently been able to rediscover the species in southern Bolivia (Dept. Tarija), during a collecting trip made in the company of my wife and the bryologist Marko Lewis, a curator at the National Herbarium of Bolivia in La Paz. *Acanthocoleus trigonus* proved to be quite common in humid *Podocarpus* forest remnants in mountain valleys, in areas with a prolonged dry season and at elevations between about 1600–2600 m. (Fig. 2). The species was always growing in thin mats on boulders along streams. In the field, the species could be easily recognized with a hand lens by its peculiar perianths, which were often completely terete and devoid of keels. Searching through the unidentified liverwort materials of the herbarium in La Paz, I subsequently found further specimens of *A. trigonus* collected by Marko Lewis in the same general area. In addition, two further collections of *A. trigonus* have recently become available: one from southern Brazil, collected by Alfons Schäfer-Verwimp and his wife, and an older collection from northern Argentina (leg. Hosseus), described by Herzog as *Archilejeunea argentinica* Herz. (Feddes Repert. 55: 12. 1952). The latter should be considered a synonym of *Acanthocoleus trigonus*.



FIG. 2. Remnants of *Podocarpus* forest in mountain valleys at about 2000 m near Entre Rios, Dept. Tarija, southern Bolivia. *Acanthocoleus trigonus* occurs on rocks along streams in these forests.

It thus appears that *Acanthocoleus trigonus* occurs in relatively dry, subtropical mountain areas of South America (Peru, Bolivia, southern Brazil, northern Argentina), in regions with a seasonally dry climate. The Lejeuneaceae flora of this region is rather poor and most of the taxa reported are widespread, neotropical species. Among the Ptychanthoideae, *Acanthocoleus trigonus* is the only species endemic to this region. An explanation for the poor Lejeuneaceae flora of subtropical South America is probably the rarity in these areas of well-developed evergreen rain forests, which are the main habitat for the species of this family. Support for this assumption comes from a comparison between the Lejeuneaceae flora of South America and Australia (Thiers 1990, Gradstein 1991). As demonstrated by Thiers, the subtropical east coast of Queensland has a rich Lejeuneaceae flora with several endemic species. This high diversity is due to the occurrence in this region of rain forests, distributed in patches from north to south along the coasts of Queensland and New South Wales and ranging well into the temperate zone. These forests offer a great variety of habitats for inhabitation by Lejeuneaceae. A similar latitudinal gradient of rain forest is lacking in the New World, however, and this, then, may well account for the poverty of Lejeuneaceae in the subtropical regions of South America.

KEY TO THE NEOTROPICAL SPECIES OF ACANTHOCOLEUS

1. Lobule large, $\frac{1}{2}$ – $\frac{2}{3}$ \times lobe length, rarely reduced, first tooth of the lobule 3–6 cells long; leaves orbicular; paroicous; Greater Antilles, Mexico, ca. 800–2500 m. *A. juddii* Kruijt
1. Lobule smaller, $\frac{1}{4}$ – $\frac{2}{3}$ \times lobe length, often reduced, first tooth 0–2 cells long; leaves ovate; autoicous or paroicous.
 2. Paroicous; perianth terete or very bluntly keeled, smooth; leaf apex rounded, entire; S Brazil, Peru, Bolivia, northern Argentina, ca. 1000–2600 m. *A. trigonus* (Nees & Mont.) Gradst.
 2. Autoicous; perianth sharply keeled, ciliate; leaf apex pointed, rarely rounded, toothed or entire; throughout the neotropics, 150–2600 m. *A. aberrans* (Lindenb. & Gott.) Kruijt

A full description of *Acanthocoleus trigonus* will appear in my forthcoming monograph of the neotropical Ptychanthoideae in *Flora Neotropica*.

Specimens examined. PERU, LAGUNA: Santa Cruz, "in *Parmelia speciosa*", D'Orbigny s.n., type of *Lejeunea trigona* Nees & Mont. (STR, holotype; PC-Mont., isotype). BRAZIL, SANTA CATARINA: Serra do Corvo Branco, road Urubici-Crao Pará, just below the pass, Dec 1990, Schäfer-Verwimp 13496 (hb. Schäfer-Verwimp, U). BOLIVIA, CHUQUISACA: Río Jatun Mayu 14 km NW of Zudanez, Lewis 84-0489 (LPB, U). TARIJA: along road Tarija-Bermejo, ca. 10 km N of La Marmora, Gradstein 7720, 7721 (LPB, U); headwaters of Río Los Pinos 20 km NW of Padcaya, Lewis 84-2910 (LPB); headwaters Río Posta along road Tarija-Entre Rios 1950 m, Gradstein 7648 (LPB, U); headwaters Río Huayco along road Narvaez-San Josecito, Gradstein 7687 (LPB, U); along Río Tambo ca. 5 km S of Narvaez, Lewis 84-2631, 84-2675 (LPB), Gradstein 7651 (LPB, U); Cerro Sarzo, 4 km NW of Canaletas, Lewis 84-2510 (LPB). ARGENTINA, CÓRDOBA: Ongamira, Hosseus s.n., type of *Archilejeunea argentinica* Herz. (JE, holotype).

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